

Chapter C4:

Engineering Systems

Design Criteria

This chapter provides criteria governing the engineering systems provided at Border Patrol facilities.

Items that are mandatory or denoted with (■) or the words “**shall**” or “**must**”. Items that are recommended are denoted with (□) or the word “**should**”. Items that can be used but are not necessarily recommended are denoted with (○) or the words “**may**” or “**can**”.

Heating, Ventilation and Air Conditioning

Heating, ventilation and air conditioning equipment must be evaluated and selected based on the climate, the size and function of the building served, the life cycle costs, and the availability of qualified service.

Many Border Patrol facilities are located in rural areas of the country. They should have basic systems that can be serviced by local trades.

Buildings with detention space require special consideration. The system must be able to adjust to the peak loads for holding areas, without oversupplying the space during normal or slow times. Also, in enclosed detention spaces with no operable windows or vents, a ventilation system must be provided for smoke removal that provides at least six air changes per hour. This can either be accomplished through the economizer cycle of an HVAC system or by separate ventilators. A smoke purge fan should be provided in the center of the processing area.

All facilities must have multiple-zone mechanical systems, with separate zones for office and processing areas. For detention areas, the mechanical systems must provide a minimum of 20 cubic feet per minute of outdoor air per occupant per ASHRAE 62-89 in addition to 6 air changes per hour of ventilation. Mechanical cooling systems should be capable of maintaining a comfort zone of 78 degrees to 85 degrees Fahrenheit.

Control Systems. If the facility is not occupied continuously, consider set-back thermostat systems that allow the system to be scheduled for normally occupied periods. Thermostats should not be located where they are accessible to inmates. For large inmate occupied areas, place thermostat sensors in return air ducts behind the barrier grill.

Individual Space Requirements. The following are special HVAC requirements for individual spaces.

- Toilets. Provide direct exhaust for all toilet and shower areas. Exhaust fans may be switched.
- Patrol Agent in Charge. Provide a separate thermostat controlling the office.
- Conference, Squad Room and Training Room. Provide separate thermostat control for each of these spaces.
- ADP Support/LAN Room. Provide a separate HVAC control for the LAN room to address heat loads emitted by electronic devices.
- Evidence Storage. Provide separate HVAC with direct exhaust for evidence storage. Fumes from stored evidence should not be introduced into the overall air supply system.
- Armories. Refer to the Construction Requirements for Armories. Specific requirements prescribed include dehumidifiers. Barrier grills must be installed in all supply and return ducts over 8 inches in diameter.
- Exercise Room. Provide separate thermostat control and direct exhaust of return air.
- Holding and Processing Areas. Provide direct exhaust of all alien-occupied areas. Provide 20 cubic feet per minute of outside air for each occupant and a minimum total of 6 air changes per hour. At processing counters, airflow should be directed from the agent across to the detainee. For isolating detainees with communicable diseases, each facility should have at least one holding cell with negative air pressure of 0.02 inches of water column and direct 100% exhaust.
- Solvents stored in maintenance and vehicle service areas must be stored in ventilated cabinets and must comply with maximum-quantity limits defined by building codes.
- Provide carbon monoxide detector alarms in the sallyports, vehicle maintenance bays, and enclosed parking facilities. Provide alarms at two different levels, one at breathing height and one near the floor. Provide an exhaust ventilator at the roof with fresh air supply near the floor, with 15 air changes per hour. When heaters are required, provide unit heaters with enclosed combustion chambers.

Plumbing Systems

This category includes toilets, lavatories, urinals, showers, sinks, floor drains, janitor closets, drinking fountains, hose bibs and utilities.

Fixture Count. Codes will identify the appropriate fixture count for the size of the facility. Note that most codes require a minimum of one fixture each for males and females in every facility for staff and public. Note that in business occupancies some codes prescribe more fixtures for females than males and may not allow unisex toilets or may restrict the size of a facility that can be served by unisex toilets.

Standards will prescribe the appropriate number of fixtures for detainees. ACA Standards for Adult Correctional Institutions prescribes one toilet and lavatory fixture for every 12 detainees. Every holding room must have unrestrained access to a toilet facility - either in the holding room or in a directly accessible adjoining room.

The following are requirements for toilet rooms. At least one toilet must be accessible for disabled individuals. In detainee occupied areas, use detention-grade institutional stainless steel fixtures with shot-peened surfaces. Do not use polished stainless steel because it harbors bacteria. For areas holding high-security-risk detainees, combination toilet/lavatory units should be used. Other detention areas may use separate lavatories and toilets.

Toilets in detainee areas must have concealed plumbing controls, with a secure access door into the plumbing chase. The access door should open outside of the cell. One detainee toilet must be accessible for disabled detainees.

Public and Staff Toilets

- Hot and cold running water
- Vitreous China toilet fixture
- Vitreous China lavatory
- Mirror(s)
- Metal Paper Towel Dispenser
- Metal waste receptacle
- Soap Dispenser
- Metal toilet partitions in rooms with multiple fixtures
- Toilet paper dispenser

Holding Cell and Male Group Holding Detainee Toilets

- Running water. Hot water is not required.
- Hold rooms 304 stainless steel combination toilet/lavatory/drinking fountain units with integral toilet paper dispenser, anti-flood devices and concealed metered plumbing controls. Toilets must be floor mounted or welded to the wall.
- Polished stainless steel mirror.
- CMU modesty panel.
- Walk-in plumbing chases, with secure access doors.

Female and Juvenile Holding Detainee Toilets

- Stainless steel institutional-grade toilet fixture, with anti-flooding device
- Stainless steel institutional-grade lavatory, with metered facet
- Toilet paper holder
- CMU modesty panel
- Polished stainless steel mirror
- Soap dispenser
- Porcelain drinking fountain

Drinking Fountains. In addition to the drinking fountains identified above, the following are the requirements for drinking fountains in Border Patrol Facilities.

- Potable water
- Public drinking fountain
- Electric cooler drinking fountain for staff
- Charcoal filter on staff drinking fountain
- Bottled water

The following areas require floor drains. Floor drains should have primers.

- Public toilets
- Staff toilets
- Detainee toilet areas
- Janitor closets
- Search Room

The following areas require hose bibs. Hose bibs must have vacuum breakers. Hose bibs should be key operated.

- Processing area and outside hold rooms

- ☐ Shower areas
- ☒ Janitor closets

Outside areas requiring hose bibs include:

- ☒ Landscaped areas
- ☒ Vehicle service areas
- ☒ Kennels and stables

Janitor Closets. Floor-mounted wash basins should be provided.

The following areas require sinks. Sinks should have lever controls with hot and cold water. Hot water should be restricted to a maximum of 107 degrees Fahrenheit.

- ☐ Break room
- ☒ Evidence staging / drug testing
- ☒ Processing area
- ☐ Fingerprint counter
- ☒ Facility maintenance shop
- ☒ Vehicle maintenance shop
- ☐ Bicycle maintenance shop
- ☐ Electronics maintenance shop

Electronic Security and Communication Systems

This section defines where specific electronic security and communication systems are to be provided. Please consult the Draft Baseline Physical Security Standards Appendix to this Guide for detailed specifications on individual systems.

Construction Responsibility. In many cases the installation of electronic and communication systems may be performed under separate contract from the base building construction contract. Some specific systems may be provided and installed by the Immigration and Naturalization Service (INS), while others will be installed as part of the building construction contract. If the GSA is involved, the GSA will provide certain items as part of the standard features and finishes and will require reimbursable work orders for other items if they provide them.

In typical projects, the INS will be responsible for providing and installing the following systems or contracting for them separately. This includes all equipment and wiring. The INS will also be responsible for these systems in facilities developed by the GSA.

- Telephones and pay telephones
- Computers and computer networks
- Radio, LLLTV Border Surveillance and Microwave systems and Radio towers
- UPS systems
- VCR audio-visual systems
- Metal Detectors

To accommodate these systems, the following must be provided as part of the base building construction contract. The GSA will provide these as part of the standard features and finishes of the facility.

- Power supply as prescribed by the system to the nearest wall. This includes dedicated and high voltage lines and emergency power lines.
- Conduits, raceways and cable trays for wiring, with pull strings.
- Telephone plywood backboards and wall blocking for racks.

The following systems are typically provided as part of the base building construction contract. Note that in GSA-developed buildings, these systems must be funded by reimbursable work orders or provided by the INS or separate contractors.

- Intrusion detection sensor systems including CCTV security camera systems and motion detectors
- Door contact switch sets
- Remote lock releases
- Remotely operated door and gate systems
- Automatic access control systems
- Intercom systems
- Duress alarms
- Emergency power generator(s)
- Room-occupied lights
- Special dimming, scenario lighting or room occupancy sensor lighting control systems

IDENT/ENCATS Stations. Special console stations must be provided in processing to contain the IDENT/ENCATS computer terminals. These terminals are standard personal computers equipped with scanning pads to read detainee fingerprints. The terminals must be encased within millwork to prevent tampering by aliens or damage from dust. A glass view panel should be provided in front of the monitor. Surface connections must be provided on the casework for attaching keyboards, scanning pads and mouse devices.

Control Center. The control center must be equipped with console units containing the security control and communication monitoring equipment, the radio base station, an intercom master station, duress switches, smoke and heat detectors, a fire alarm (zone) annunciation panel and a telephone. The control center can also have a VCR system for broadcasting alien rights information to the holding cells.

CCTV Camera Systems. Stations that are staffed continuously should have a CCTV camera surveillance system. These systems should provide surveillance for exterior and interior areas and be monitored by the control center and/or off site. They should be visible but not accessible so individuals contemplating unauthorized activity know they are being monitored. Requirements for pan/tilt/zoom features, color or low-light capability and alarms and the feasibility of video motion detection must be determined on an individual-project basis. Please refer to the recommendations contained in the Draft Baseline Physical Security Standards included as an appendix to this Guide.

Detection and Duress Alarm Systems. Alarms should be used for rooms that are not normally occupied and should be accessed by authorized staff only. These include computer rooms, storage rooms, armories, and equipment rooms containing sensitive or vital equipment. They should be monitored by the control center when staff are present in the building and by the Sector dispatch centers when the Station is unmanned.

Door Contact Switch Sets. Doors and windows identified in the schedule for contact switch sets should have both a door position and a lock position monitor. Contact switches should also be installed on all windows, hatchways, access panels and other means of entering the space. Glass-break sensors shall also be installed for monitored windows. For Stations that are continually staffed, monitors should be connected to the control center. For Stations that may be unmanned at times, alarm calls should be served by local law enforcement and security services as well as connected to the closest Sector dispatch center. In addition to notification, monitors should activate audio alarms that sound for 10 minutes after activation.

Remote Lock Release. Electrical mechanical locks will be necessary in many stations in areas where secure access must be controlled to efficiently utilize staff resources and to provide safe emergency egress from detention areas. The type of lock - electric strike, electric deadbolt, magnetic lock, or jamb-mounted motorized deadlocks - must be determined on a case-by-case basis. Magnetic locks should be used in high-traffic areas, such as at staff and public entrances, though electric strike release may also be considered. Motorized jamb deadlocks should be used at detention doors. An intercom must be provided to allow the entrants to communicate with the door operator. The doorway should be monitored by CCTV cameras to allow the operator to positively identify the person requesting entrance. Automated access control systems, such as keypads, may also be used to operate the locks.

Locations that should have remote lock release include the main entrance door, the door from the public reception to the restricted staff area, the exterior staff and patrol entrance doors, the door connecting the processing area with the office area, the door into the control center, and the door between the processing area and the vehicle sallyport.

All remote lock releases must have emergency power backup by a battery system and should be on the building emergency generator if one is provided. All electric locks must have secondary key operation. Doors unlocked during emergency situations shall not relock when closed unless specific action is taken to relock them.

Specific requirements for remote locking control, emergency power backup and the power failure status of the locks must be reviewed on a case-by-case basis for each door.

In general:

- All emergency exit doors from office areas equipped with remote release must fail “safe”, with the door in the open position in the event of total power loss. These doors should also be equipped with locking latchsets, and have panic release from the secure side.
- All emergency exit doors from detention areas equipped with remote release should fail “secure”, with the lock in the closed position in the event of total power loss. These doors must have manual mechanical means to release the door. Emergency power battery backup must be capable of providing power to the door within 10 seconds of primary power failure and sustain the emergency power supply to the door for up to 90 minutes.

Power Operated Door. Remote controls that allow an operator to open the door should be provided where agents may be managing detainees or at vehicle doors. Doors with remote power operation should have camera surveillance to allow the operator to positively identify the entrants. The doors should have an intercom to allow the entrant to communicate with the operator. Power-operated doors and vehicle doors may be operated by keypad or other automated access control system.

Automated Access Control Systems. Self-operated access control systems should use key pads. Card readers, key fob readers, cipher locks and other access control systems may be considered, though card readers and similar systems are not preferred, because cards can be damaged or lost and require frequent replacement. Access control systems can be connected to computer systems and recording systems to track access.

Network Equipment Racks and Patch Panels. Network systems will be distributed through the ceiling plenums and down partitions or columns. Patch panels should be provided to allow for reconfiguring network systems. Office areas may distribute network wiring through the furniture wire management systems. Cable trays or ladders for ceiling plenum cable distribution should be provided as part of the base building construction contract. Cable trays are required to keep network cables separate from lighting and power distribution lines. Cables should never come within 4 inches of power lines. Equipment racks and patch panels will be wired from the back up to the ceiling plenum through conduit buses. Equipment racks require 22 inches for width and are 7 feet tall and require 24 inches of clearance on each side.

Provide 2-inch conduits between panels and workareas. Provide 4-inch conduits between equipment rooms. Provide 50% excess capacity in network conduits, with pull boxes every 100 feet and every two 90-degree bends. All turns shall be hydraulic bends.

The following matrix identifies the security and communication systems required for the individual rooms within Border Patrol Stations.

Space	Camera	Motion Detector	Door Monitor	Remote Lock Release	Remote Door Control	Key Pad	Intercom	Duress Alarm	Telephone	Pay Telephone	Data/LAN	Emergency Power	UPS Power	Metal Detector	Occupied Light	Audio Visual System
Main Building Perimeter	■		■			□				□						
Administrative Spaces																
Public Lobby	■		■	■		□	■					□				
Public Interview Room			□				□	■	□		□				○	
Public Toilet																
Receptionist	■		■				■	■	■		■					
Patrol Agent-In-Charge								■	■		■					
Asst. Patrol Agent-In-Charge								■	■		■					
Public Information Officer									■		■					
Secretary / Clerk									■		■					
ADP Support LAN Room		■	■						■		■	□	■			
Administrative Files																
Storage / Supplies																
ADP Printers											■	□	■			
Conference									■							■
Staff Toilet																
Special Operations																
Special Operations Supervisor									■		■					
Special Operations Files																
Special Operations Staff		■	■						■		■					
Patrol Command																
Field Operations Supervisor									■		■					
Supervisor BP Agent									■		■					
Detention Enforcement Officers									■		■					
Report Writing / Quiet Room									■		■					
Agent Privacy/OA Office									■		■					
Evidence Control Officer			□						■		■					
Evidence Storage		■	■			■							□			
Evidence Staging / Drug Testing			□													
Squad Room																
Squad / Muster Room									■		□					■
Mail Room																
Break / Coffee Bar									■							
Field Support and Communications																
Dispatch Position						□	■	■			■	□	■			
Dispatch Equipment Room		■	■								■	□				
MW Equipment Room		■	■								■	□				
Operations Office									■		■	□				
Armory		■	■					■				□	■			
High-Powered Munitions		■	■									□	■			
Gun Lockers @ Staff Entry																

Space	Camera	Motion Detector	Door Monitor	Remote Lock Release	Remote Door Control	Key Pad	Intercom	Duress Alarm	Telephone	Pay Telephone	Data/LAN	Emergency Power	UPS Power	Metal Detector	Occupied Light	Audio Visual System
Training																
Multiple Purpose Training Room																
Training Library																
Training Supplies																
Training Officer																
Exercise and Lockers																
Exercise Room																
Male Staff Lockers																
Male Staff Toilet																
Male Staff Shower																
Female Staff Lockers																
Female Staff Toilet																
Female Staff Showers																
Alien Processing and Detention Space																
Processing Entrance																
Gun Lockers																
Search Room																
Alien Property Storage																
Security Control Station																
IDENT Processing Positions																
Processing Positions																
Fingerprint / Photo ID Position																
Interview																
Male Holding																
Female Holding																
Juvenile Holding																
Segregated Holding																
Facility Support																
Archival Files																
Storage																
UPS/Battery Storage Room																
Physical Plant Support																
PBX Equipment																
Telephone Closet																
Electrical Equipment																
Electrical Closet																
Mechanical Equipment																
Janitor Closets																
Support Building Perimeter																

Space	Camera	Motion Detector	Door Monitor	Remote Lock Release	Remote Door Control	Key Pad	Intercom	Duress Alarm	Telephone	Pay Telephone	Data/LAN	Emergency Power	UPS Power	Metal Detector	Occupied Light	Audio Visual System
Vehicle Service and Maintenance																
Vehicle Maintenance Supervisor									■		■					
VARs/Tools & Parts Clerk									■		■					
Vehicle Records				■												
Fuel Control System																
Staff Toilet																
Break / Coffee Bar																
Tool Storage			■													
Parts Storage			■													
Bulk Oil			■													
Tire Storage			■													
Vehicle Maintenance Bay			■						■		■					
Shops			■						■		■					
Electronic Equipment																
Electronic Equipment Storage			■													
Equipment Repair Shop			■						■		■					
Vehicle Preparation Bay			■						■		■					
Site Elements																
Radio Communications Tower																
Entry Sign																
US Flag Pole																
Site Lighting												■	■			
Perimeter Fence	■															
Restricted Zone Vehicle Gate	■		■		■	■	■						■			
Trash Storage / Dumpster	■															
Fuel Storage																
Fuel Island	■															
Parking																
Vehicle Sallyport	■		■		■	■	■	■					■	■		
Covered Government Vehicle Parking	■															
Enclosed Government Vehicle Parking	■				■											
ASU Government Vehicle Parking	■		■													
Employee Parking	■															
Visitor Parking	■															
Service Vehicle Parking	■															
Impoundment Lot Parking Spaces	■		■													
ATV/Motorcycle Vehicle Storage	■															
Helicopter Pad																

Lighting

General lighting in office and support areas will be recessed fluorescent parabolic fixtures, with switches at the entry to each space.

Provide special lights with dimmer controls in the conference room, training room and squad room for both general meetings and presentations. Provide dimmer controls in drug testing laboratory areas.

Provide adjustable lighting controls in control centers and dispatch Stations.

Consider occupancy sensors for toilets, showers, locker rooms, storage and equipment rooms.

Provide color-corrected lighting in search room, evidence staging / drug testing rooms, and at processing consoles and photo/fingerprint work areas.

Avoid high-contrast lighting and glare at observation windows.

Lighting controls should not be accessible to the public or aliens under custody.

The following lighting levels should be provided:

- 60 Footcandles for typical office type spaces including all administrative spaces, special operation spaces, patrol command spaces, squad room and related spaces, field support and communication spaces, exercise and locker spaces, alien processing spaces and vehicle maintenance office spaces.
- 75 Footcandles for alien detention holding spaces.
- 30 Footcandles for facility support spaces, physical plant support spaces, storage spaces for vehicle maintenance and electronics spaces, and vehicle maintenance bays.
- 10 Footcandles for enclosed government vehicle parking spaces.

Please refer to Chapter C2 Site Design for site lighting illumination levels.

Power

Provide 50-percent expansion capacity in power panels for future circuits.

Provide power at eight feet on center through the office areas of the building.

Provide 40-amps of electrical service with surge protection to each IDENT/ENCATS console in processing areas.

Provide six power outlets behind network equipment racks. Provide a minimum of 2 separate 20-Amp circuits in each equipment closet. Provide grounding wires connected to a main building grounding system. Coordinate grounding system distribution to network architecture to avoid cross interference across circuitry.

Provide emergency power generators under the following circumstances:

- It serves infrastructure for other law enforcement agencies
- The facility must operate during emergency periods
- If an analysis determines that an emergency generator is more economical than using battery emergency power sources for those items requiring emergency power

Provide emergency power to telephone and equipment rooms, fire alarm systems, smoke evacuation systems, emergency lighting systems, perimeter and parking site lighting, impoundment lot lighting, security lock control and power-operated door control systems, intrusion detection systems, computer systems and communication systems.

At northern stations, provide power outlets at staff and government vehicle parking for vehicle block heaters.